

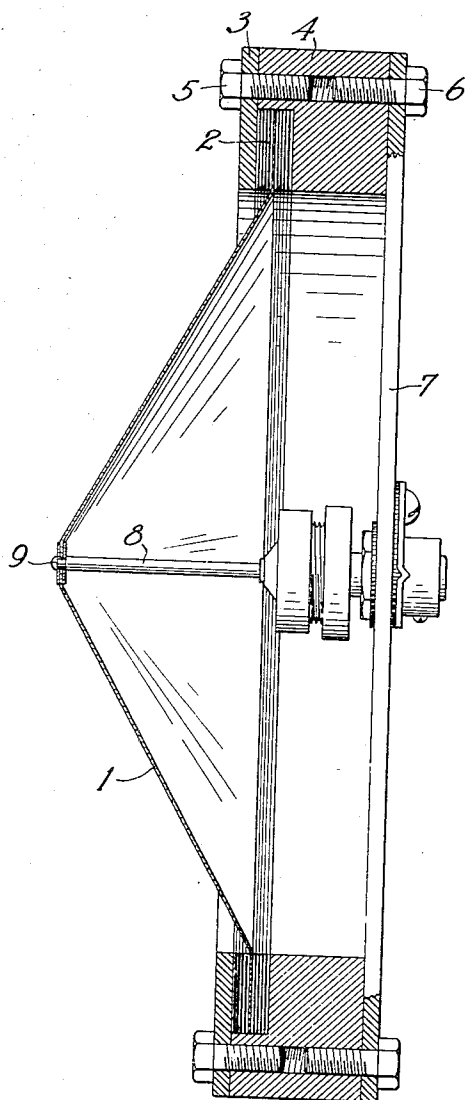
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C. R. MOORE

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MOUNTING FOR PHONIC DIAPHRAGMS

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Inventor:
Charles R. Moore,
by Joel C. Palmer Atty

UNITED STATES PATENT OFFICE

CHARLES R. MOORE, OF MAPLEWOOD, NEW JERSEY, ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

MOUNTING FOR PHONIC DIAPHRAGMS

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This invention relates to large direct acting diaphragms and more particularly to means for mounting them.

With particular reference to large direct acting phonic diaphragms, it has been proposed to mount such diaphragms by means of rings which clamp the periphery of the diaphragm. The diaphragm thus mounted vibrates in a manner analogous to a closed pipe, and the lowest prominent natural frequency thereof is higher than in the case of another arrangement which has been previously used, that is, a diaphragm mounting which permits the periphery to vibrate freely. The latter diaphragm vibrates in a manner analogous to an open pipe and reproduces low notes better than the diaphragm with the clamped periphery. In the case of either the clamped periphery or the free periphery, there is more or less reflection at the periphery which prevents the quality of transmission from being as good as is the case with the present invention and according to which the periphery is damped in its vibration, the amount of the damping preferably automatically increasing with the increased vibration of the diaphragm.

Such a damping means may conveniently take the form of so-called "book damping" which comprises a loose stack of sheets of paper or the like, the spacing factor, for instance, being fifty per cent.

The mode of operation of this damping means will be made clear by considering the following analogy. If a stone is dropped into a pond of water, waves will proceed to the shore and will be reflected from the shore, the reflected waves interfering with the initial waves. A somewhat similar interference occurs in the case of the diaphragm having either a clamped or a free periphery.

If, however, we consider the action of the initial waves at a shore which is closely set with grass or weeds, it is seen that the initial waves will be absorbed at the shore and that there will be no reflection to cause interference.

The diaphragm damping means which it is proposed to use according to the present invention, is similar in its operation to that of

the last mentioned shore which prevents reflection.

For further details of the invention, reference may be made to the drawing wherein is shown an elevation partly in cross-section of a diaphragm mounting as applied to a transmitter.

Referring to the drawing, the diaphragm 1 is illustrated as a large direct acting conical diaphragm which may be of paper or other light and stiff material and which may be of the order of six inches or more in diameter, and if six inches in diameter, may be about two inches high. The periphery of this diaphragm is supported between loosely packed sheets of paper 2 confined in the space between clamping rings 3 and 4 suitably held together by means such as bolts 5. Due to this looseness in packing, a plurality of cushioning air films will be present between said sheets of paper or other suitable material. To the ring 4 is clamped, by means of bolts 6, a ring 7 which supports the stationary elements of a carbon button transmitter, of any suitable type, the movable element of the transmitter having fastened thereto a rod 8 which is riveted or otherwise fastened to the diaphragm 1 at its center 9.

For small vibrations in the diaphragm, damping at the periphery will be small due to the limited motion of the periphery between the loosely packed sheets of paper. It will be apparent that as the vibration of the diaphragm increases, the effectiveness of the peripheral damping will increase also. As the frequency of the drive increases the stiffness factor, that is, the elasticity of the diaphragm support at the edge, increases also. The result of this is to raise any apparent natural frequency the diaphragm may have.

While the invention has been shown as applied to a conical diaphragm, it is not necessary that the diaphragm should have this form. Furthermore, the diaphragm may be used for loud speaking receivers, as well as for transmitters.

What is claimed is:

1. A large direct-acting diaphragm, a support therefor, and a plurality of thin sheets of light material stacked loosely to provide

a multiplicity of air films interposed between said support and the peripheral margin of said diaphragm.

2. A cone-shaped diaphragm, a rigid support about the periphery and out of contact with the sides of said diaphragm, and loosely disposed light material between said support and the peripheral margin of said diaphragm.

3. A large direct-acting diaphragm, a rigid support for said diaphragm, and yielding means comprising a plurality of layers of loosely disposed material between said support and the peripheral margin of said diaphragm.

4. In combination a direct acting diaphragm, a support for said diaphragm and means comprising a plurality of layers of paper on both sides of the periphery thereof, between said support and the diaphragm, for effectively reducing reflection of vibrations from the periphery along the diaphragm.

5. The combination with a large direct-acting diaphragm having a configuration to impart to it inherent stiffness from the center outwardly, of a rigid support about the edge portion and out of contact with the sides of said diaphragm, and yielding material interposed between said support and the edge portion of the diaphragm for permitting limited vibration of the edge portion thereof.

6. A diaphragm exposed on at least one side to the free air composed of a sheet-like material of uniform thickness and so shaped as to impart stiffness to it, a rigid support, a yielding material at the rim portion of said diaphragm between the rim of said diaphragm and said support, said diaphragm being free from restraint with respect to axial movement except for the resistance offered by said yielding material.

7. A large direct acting conical diaphragm having a flange portion, a channel shaped support for said diaphragm, and loosely disposed material on both sides of said diaphragm at its flange portion between said diaphragm and said support, said diaphragm being free to move axially except for the restraint offered by said loosely disposed material.

In witness whereof, I hereunto subscribe my name this 7th day of June, A. D. 1923.

CHARLES R. MOORE.